Basic Science for America's Energy Future:
Challenges and Opportunities

Presentation to the Federation of Materials Societies

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The Office of Science

Office of Science
FY 2009 Budget Request to Congress
(dollars in thousands)

	FY 2007 Approp.	FY 2008 Request	FY 2008 Approp.	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences	1,221,380	1,498,497	1,269,902	1,568,160	+298,258	+23.5%
Advanced Scientific Computing Research	275,734	340,198	351,173	368,820	+17,647	+5.0%
Biological and Environmental Research	480,104	531,897	544,397	568,540	+24,143	+4.4%
High Energy Physics	732,434	782,238	689,331	804,960	+115,629	+16.8%
Nuclear Physics	412,330	471,319	432,726	510,080	+77,354	+17.9%
Fusion Energy Sciences	311,664	427,850	286,548	493,050	+206,502	+72.1%
Science Laboratories Infrastructure	41,986	78,956	66,861	110,260	+43,399	+64.9%
Science Program Direction	166,469	184,934	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists	7,952	11,000	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross)	75,830	76,592	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding)	86,936	———	———	———	———	———
Subtotal, Office of Science	3,812,819	4,403,481	3,902,707	4,721,969	+819,262	+21.0%
Adjustments*	23,794	-5,605	70,435	———	-70,435	———
Total, Office of Science	3,836,613	4,397,876	3,973,142	4,721,969	+748,827	+18.8%

* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 only), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects and a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).

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Funding increases proposed under the American Competitiveness Initiative have not been realized.

- The President's Request for SC for FY 2007 was $4,102M.
  The Appropriation for SC for FY 2007 was $3,813M. Δ = - $289M.
- The President's Request for SC for FY 2008 was $4,404M.
  The Appropriation for SC for FY 2008 was $3,903M. Δ = - $501M.
- **The President's Request for SC for FY 2009 is $4,722M,**
  an increase of $749M over the FY 2008 Appropriation.

The SC Office of Basic of Basic Energy Sciences (BES):

- The President's Request for BES in FY 2007 was $1,421M.
  The Appropriation for BES in FY 2007 was $1,250M. Δ = - $171M.
- The President's Request for BES in FY 2008 was $1,499M.
  The Appropriation for BES in FY 2008 was $1,270M. Δ = - $229M.
- The President's Request for BES in FY 2009 is $1,568M,
  an increase of $298M over the FY 2008 Appropriation.

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FY 2008 Impacts to BES Programs Affect Opportunities for the FMS Communities

Research:

- Approximately 700 proposals in response to BES initiatives in solar energy utilization, hydrogen research, advanced nuclear energy systems, and mid-scale instrumentation were declined. Approximately 250 new awards were anticipated under the BES FY 08 budget request.
- Core research in FY 08 will be approximately flat funded with FY 07, resulting in reductions in effort due to inflation.

Facilities Operations:

- The operations of the Intense Pulsed Neutron Source at Argonne National Laboratory have been permanently terminated
- The operations of all remaining BES user facilities are flat funded with FY 07, resulting in reduced hours of operation and reduced service to users. (synchrotron radiation light sources, the neutron scattering facilities, the electron beam microcharacterization centers, and the nanoscale science research centers)

Constructions:

- The National Synchrotron Light Source-II at BNL is funded at a level that is 33% below the budget request.
- The Advanced Light Source User Support Building at LBNL is funded at a level 70% below the budget request, resulting in more than one year delay and several million dollars cost increases.
- Major instrumentation fabrication projects for the Spallation Neutron Source at ORNL and Linac Coherent Light Source at SLAC are funded at a level 40% below the respective budget requests.

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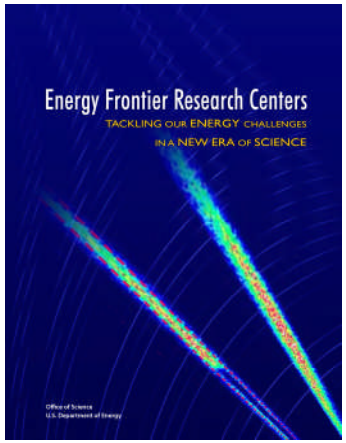
Energy Frontier Research Centers

Opportunities in FY 2009

EFRC



Energy Frontier Research Centers will bring together the skills and talents of multiple investigators to enable research of a scope and complexity that would not be possible with the standard individual-investigator or small-group award.

- Up to $100M will be available in FY 2009 for EFRC awards that are $2-$5 million per year for an initial 5-year period, pending appropriations.
- Universities, DOE national laboratories, nonprofits, and for-profit entities are eligible to apply.
- Letters of Intent are due July 1, 2008.
- Full applications are due October 1, 2008.

EFRC Funding Opportunity Announcement was published on April 4, 2008.
See: http://www.sc.doe.gov/bes/EFRC.html

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Energy Frontier Research Centers

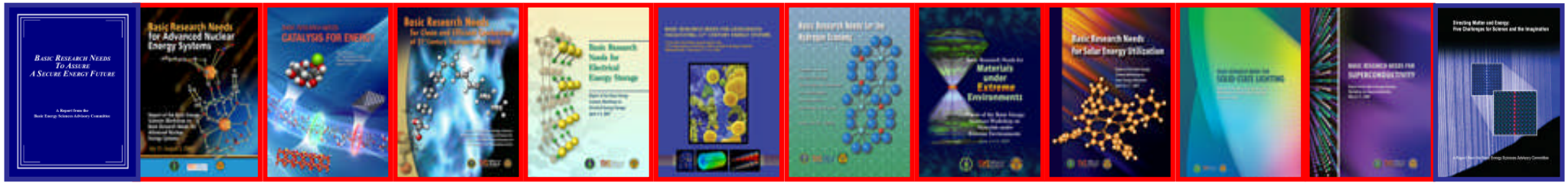
Tackling Our Energy Challenges in a New Era of Science

EFRC

Energy Frontier Research Centers will pursue fundamental research that addresses both energy challenges and science grand challenges in areas such as:

- Solar Energy Utilization
- Catalysis for Energy
- Electrical Energy Storage
- Solid State Lighting
- Superconductivity
- Bioenergy and Biofuels
- Geosciences for Nuclear Waste and CO_2 Storage
- Advanced Nuclear Energy Systems
- Combustion of 21st Century Transportation Fuels
- Hydrogen Production, Storage, and Use
- Materials Under Extreme Environments

http://www.sc.doe.gov/bes/EFRC.html



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Single-Investigator and Small-Group Research

Tackling our energy challenges in a new era of science

Up to $60M will be available for single-investigator and small-group awards in FY 2009

- BES seeks applications in two areas: grand challenge science and energy challenges identified in one of the Basic Research Needs workshop reports.
- Awards are planned for three years, with funding in the range of $150-300k/yr for single-investigator awards and $500-1500k/yr for small-group awards (except as noted below), pending appropriations.
- Areas of interest include:

  Grand challenge science: ultrafast science; chemical imaging; complex and emergent behavior

  Tools for grand challenge science: midscale instrumentation; accelerator and detector research (awards capped at $5M over 3-year project duration)

  Use inspired discovery science: basic research for electrical energy storage; advanced nuclear energy systems; solar energy utilization; hydrogen production, storage, and use; geological CO_2 sequestration; other basic research areas identified in BESAC and BES workshop reports with an emphasis on nanoscale phenomena

- For full details see: **http://www.sc.doe.gov/bes/SISGR.html**